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Case review

Patterned postmortem ant abrasions outlining clothing and body position after death

Roger W. Byard [a,b,*], Karen J. Heath [a,b]

[a] The University of Adelaide Medical School, Frome Road, Adelaide, SA 5005, Australia
[b] Forensic Science SA, 21 Divett Place, Adelaide, SA 5000, Australia

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ABSTRACT

Analysis of a series of cases where post mortem lesions had been caused by ant activity demonstrated two types of specific lesions, the first associated with clothing, and the second with the position of the body of the decedent. The first type of injury consisted of areas of abraded parchmented skin with well-defined straight edges that marked the perimeter of clothing. The second lesion consisted of circular abraded injuries that outlined the junction between the body and the surface that it was resting on, essentially tracing the outline of the point of contact. In both situations ants had been unable to gain access to skin beneath elasticized clothing or parts of the body pressed against the floor or ground. This had resulted in a visual record of the edge of clothing and the position of parts of the body after death. This information may be important if clothing has been removed prior to autopsy or if lividity is minimal. These unique lesions also show that not all insect predation on bodies obscures information.

1. Introduction

Post mortem predation by a wide range of animal and insect species can create considerable problems at the time of autopsy when attempting to differentiate post from antemortem injuries.[1] Different species are associated with different lesions that are influenced by the size of the marauding animal, the nature of the feeding process, and the environment of the body and animal. For example, terrestrial carnivores such as dogs and foxes will often strip soft tissues from the face and head and eventually eat their way into the chest cavity.[2] Bears focus more on the axial skeleton and remove vertebrae, while aquatic sea lice burrow under the skin removing large amounts of subcutaneous soft tissues.[3]

Insects tend to colonize bodies in an orderly sequence such that entomologists are able to make an estimate of the time of death based on the species present and the degree of decomposition. Ants are very early colonizers of corpses and feed off keratin in eyelashes, eyebrows and the superficial skin. While the classical serpiginous, parchmented lesions are well-recognized,[4–6] the following cases demonstrate particular patterned lesions that give clues as to the clothing worn and the position of the body during predation.

2. Case details

The following cases were selected from the autopsy files at Forensic Science SA to demonstrate particular patterned lesions that delineated clothing and the position of the body after death. Case details not pertaining to the discussion have not been included.

Case 1

An 82-year-old man was found deceased lying on his right side at his home address. Death was due to ischemic heart disease. At autopsy the body was covered with large ants (Fig. 1) which had left typical serpiginous markings. On the legs the confluent abraded areas demonstrated straight lower margins corresponding to the junction with socks that the decedent had been wearing at the time of death (Fig. 2). In addition, a curved reddened area of ant abrasion was present on the right side of the forehead and face that encircled blanched areas of the forehead, face and cheek which had been in contact with the ground (Fig. 3).

Case 2

A 15-year-old girl whose body had been dumped in the country after she had been strangled was covered in ants and millipedes. At autopsy numerous serpigenous parchmented lesions were found due to insect activity. In addition, parchmented areas on her right

* Corresponding author. Discipline of Anatomy and Pathology, Level 3 Medical School North Building, The University of Adelaide, Frome Road, Adelaide, SA 5005, Australia. Tel.: +61 8 8226 7700; fax: +61 98 8226 7777.
E-mail address: roger.byard@sa.gov.au (R.W. Byard).

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hip and buttock showed characteristic straight lines that corresponded to the position of her underpants (Fig. 4). Further details of this case have been previously published.[4]

Case 3

A 68-year-old man was found deceased lying on the ground on his left side. Death was due to a self-inflicted gunshot wound to the head. At autopsy an irregular curved reddened area caused by ant activity was present around the left side of the forehead extending into the hair line associated with blanching in the cenetr (Fig. 5).

Case 4

A 59-year-old man was found deceased lying on his right side at his home address. Death was due to ischemic heart disease. At autopsy a curved reddened area caused by ant activity was present around the right side of the forehead associated with blanching in the center (Fig. 6). Further details of this case have also been previously published.[3]

Case 5

A 36-year-old man was found deceased lying on his back in a city park on an irregular grassed surface. Death was due to blunt cranial trauma. At autopsy blanching of the back was outlined by an irregular curvilinear abraded area caused by ant activity (Fig. 7).

3. Discussion

Injury interpretation at autopsy is complicated by the inevitable development of autolytic and putrefactive changes that commence immediately after death. While the precise timing of individual stages is highly variable, the steps in the progression from a fresh cadaver to skeletonized remains are well recognized.[2] All stages are associated with particular artefacts that have the potential to interfere with injury identification and dating. These range from the simple discoloration of lividity mimicking or disguising bruises, to actual loss of tissues surrounding penetrating wounds from decomposition. A factor that further complicates assessment of possible injuries involves the actions of insects, including ants that have been attracted by the miasma of decomposition. Fly larvae (maggots) activity is one of the better examples of insect actions that can lead to extensive tissue and organ destruction.

Fig. 1. Large ants were present all over the body in case 1. In this view ants can be seen near an abraded lesion in the fold of the right axilla.

Fig. 2. An area on the right lower leg of case 1 demonstrating confluent markings from ant activity that had outlined the upper edge of a sock.

Ant species are early scavengers that harvest eyelashes, eyebrows (Fig. 6) and superficial layers of skin. The resultant thinning of the epidermis leads to increased fluid loss with the development of yellow-brown areas of dried skin known as “parchmenting”. Post mortem lesions created by ants typically show linear parchmenting with a characteristic serpiginous edge created by multiple pairs of ant pincers nibbling away at the skin surface. This type of lesion may, however, appear quite different in dependent areas of the body associated with lividity, where they tend to be red in color.[7]

Most of the post mortem lesions created by ants are irregular and do not provide any information that may assist in the interpretation of features of a case; in fact ant activity is usually a hindrance, and at its worst may result in skin erosions and/or bleeding from dependent parts that may be misinterpreted as being due to antemortem inflicted injury.[4,7] The purpose of the current study was to demonstrate situations where ant injuries may be of some use in recording the presence of clothing and the position of the body after death. Although brief details from two of the cases (cases 2 & 4) have been previously published,[3,4] this was to demonstrate

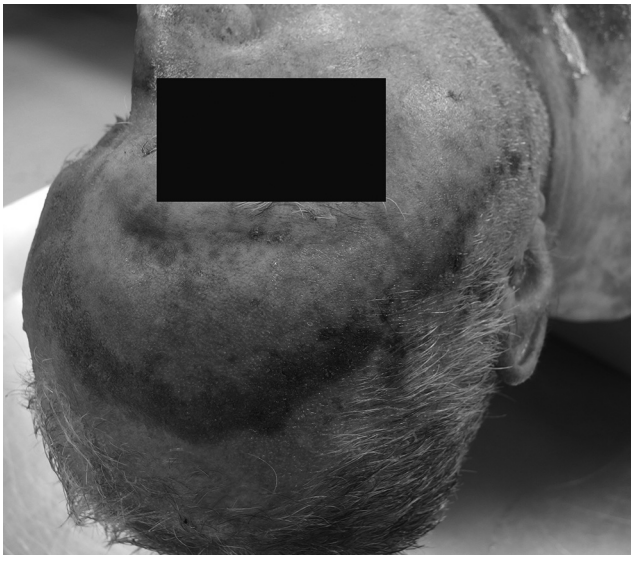

Fig. 3. A curvilinear reddened area of ant abrasion on the right side of the forehead and face extending in front of the ear with central blanching in case 1 marking the area of contact with the ground and thereby recording the position of the body.

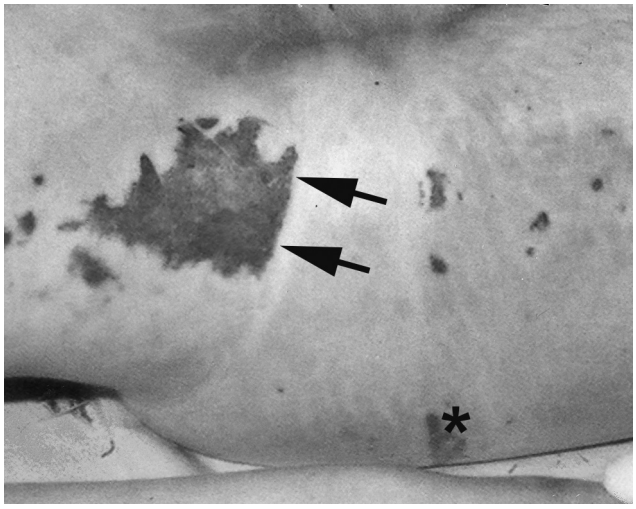

Fig. 4. A parchmented area on the right hip in case 2 with a characteristic straight line (arrows) that corresponded to the upper edge of the underpants. A smaller lesion on the buttock marked the lower edge (asterisk). Linear blanching from the elastic of the underpants can also be seen.

classical ant injuries, rather than to focus on the significance of the patterned lesions which was not appreciated at the time. The first type of injury consisted of a typical area of parchmented skin, with one difference in that there was a well-defined straight edge on one margin. This had resulted from ants being unable to gain access to skin that was protected beneath elasticized clothing such as socks or underwear (Figs. 2 and 4). In this instance ant activity abutting clothing had served to record the position of the edge of material that was on the body at, or soon after, the time of death. The sharply demarcated boundary outlining easily-moved clothing also confirmed that the injuries did not occur from some other mechanism, as abrasions from a sliding/dragging injury would not be expected to stop at a loosely fitting edge of material.

The second lesion was more striking in appearance. It consisted of a semi-circular abraded injury around areas such as the side of the face and head which corresponded to the junction between the body and the surface that it was resting on (Figs. 3, 5 and 6). The mechanism of its formation was similar to that seen with clothing above, in that ants were unable to access skin that was compressed between the side of the head and the floor or ground. Ants then damaged the skin at the edge of this area, essentially tracing the outline of the point of contact. The side of the lesion provided further information on the position of the body which may not be available if lividity had not been fixed prior to body movement and retrieval. The type of lesion may be seen at any point of contact, such as the back in case 5.

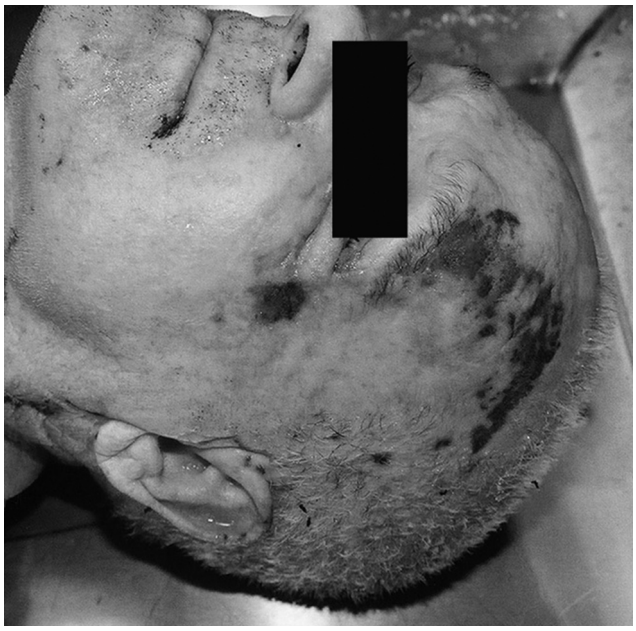

Fig. 5. An irregular curved reddened area caused by ant activity around the left side of the forehead extending into the hair line associated with blanching in the center (case 3), providing useful information on the position of the body.

Fig. 6. A semi-circular reddened area caused by ant activity around the right side of the forehead associated with blanching in the center (case 4), recording the position of the body. In this case the ant abrasion had extended through the eyebrow which shows evidence of hair removal.

The usefulness of these markers of ant predation is that the skin lesions provide a visual record outlining clothing and the position of the head/body. The information may be important if clothing has

Fig. 7. Blanching of the back outlined by an irregular curvilinear abraded area caused by ant activity in case 5. This demonstrates that the body had been lying supine for long enough to fix lividity and sustain the ant injuries.

been removed prior to autopsy or if lividity is minimal; alternatively it may corroborate information already deduced from the pattern of lividity and pressure blanching. These unique lesions also demonstrate that not all cadaveric trauma from insect activity necessarily obscures information.

Keypoints

Typical post mortem ant activity causes yellow serpiginous, parchmented lesions in the skin.

This study reports two types of specific lesions caused by ants that provide a visual record of the position of clothing and parts of the body after death.

The first type of injury consists of areas of abraded parchmented skin with well-defined straight edges that marked the edges of clothing.

The second lesion consists of circular abraded injuries that outlined the junction between the body and the surface that it was resting on, outlining the points of contact.

These lesson demonstrate that not all insect predation on bodies obscures information.

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Conflicts of interest
None.

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